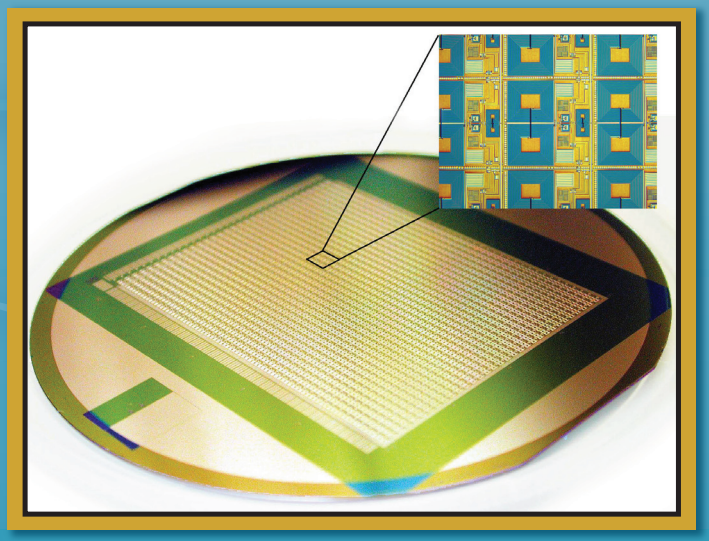
Advanced Instrumentation Seminars

October 3, 2007
1:30 pm, 1st Floor
Kavli Auditorium

Superconducting Detector Arrays:
From Cosmology to Nuclear Non-Proliferation

Guest Speaker –
Dr. Kent Irwin
National Institute of Standards and Technology



Superconductivity is a powerful tool for the detection of electromagnetic radiation from microwaves through gamma rays. The superconducting transition-edge sensor (TES), a leading superconducting direct detector technology, uses a superconducting film biased in the superconducting transition as a sensing element.

TES arrays have evolved beyond the research and development phase, and they are being used in applications as diverse as astronomy, nuclear and particle physics, and materials science. These arrays are instrumented by superconducting quantum interference device (SQUID) multiplexed amplifiers. I will discuss the development of multiplexed superconducting transition-edge sensor arrays, and highlight their use cosmology and nuclear non-proliferation, where they are providing new capabilities for sensitive measurements of the cosmic microwave background and the elemental and isotopic content of nuclear materials.

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